CLAIMS

What is claimed is:

1. A projection method for directing a collection of light emitting devices toward pixel locations during a frame to make an image having pixels that are illuminated at least in part by light emitted from the directed light emitting devices, the method comprising the steps of:

during a subframe of the frame, directing at least one of the light emitting devices toward a pixel location; and

during another subframe of the same frame, directing at least one of the light emitting devices toward a sub-pixel vicinity of the same pixel location, thereby making that a sub-pixel vicinity of that pixel location a light emitting device target at least twice during that frame;

wherein each of at least some of the light emitting devices in the collection is directed during the same frame toward at least two different pixel locations, and a light emitting device can be directed toward a pixel location regardless of whether the light emitting device emits light.

2. The method of claim 1, wherein sub-pixel vicinities of the same pixel locations are light emitting device targets more than twice during the frame.

3. The method of claim 1, wherein at least two different light emitting devices of a given color are directed toward a sub-pixel vicinity of the same pixel location during the frame.

4. The method of claim 1, wherein light emitting devices are directed toward sub-pixel vicinities of some pixel locations in swaths such that adjacent light emitting devices are directed at adjacent pixel locations during a subframe.

5. The method of claim 1, wherein light emitting devices are directed toward pixel locations in stripes such that adjacent light emitting devices are directed at nonadjacent pixel locations during a subframe.

6. The method of claim 1, wherein the subframes are of substantially equal duration.

7. The method of claim 1, wherein a total illumination reaching a pixel location from the light emitting devices during the frame is divided substantially equally between all subframes of the frame.

8. A projection method comprising the steps of:

during a subframe of a frame, directing a light emitting device toward a pixel location; and

during another subframe of the same frame, directing a light emitting device toward a sub-pixel vicinity of the same pixel location, thereby making a sub-pixel vicinity of that pixel location a light emitting device target at least twice during that frame;

wherein each of at least some of the light emitting devices in a collection of light emitting devices is directed during the same frame toward at least two different pixel locations, regardless of whether the light emitting device emits light, and light emitting devices are directed toward pixel locations in swaths such that adjacent light emitting devices are directed at adjacent pixel locations during a subframe.

9. The method of claim 8, wherein light emitting devices are directed toward a sub-pixel vicinity of the same pixel locations during each of at least four subframes of the frame.

10. The method of claim 8, wherein a sub-pixel vicinity of each pixel location is a target of at least two different light emitting devices of a given color during the frame.

11. The method of claim 8, wherein the swaths are diagonal such that a row of light emitting devices is directed at a selection of pixel rows which varies linearly during a subframe.

12. A projection method comprising the steps of:

during a subframe of a frame directing a light emitting device toward a pixel location; and

during another subframe of the same frame directing a light emitting device toward a sub-pixel vicinity of the same pixel location, thereby making that pixel location a light emitting device target at least twice during that frame;

wherein each of some of the light emitting devices in a collection of light emitting devices is directed during the same frame toward at least two different pixel locations, regardless of whether the light emitting device emits light, and light emitting devices are directed toward pixel locations in stripes such that adjacent light emitting devices are directed at nonadjacent pixel locations during a subframe.

13. The method of claim 12, wherein light emitting devices are directed toward pixel locations during each of at least ten subframes of the frame.

14. The method of claim 12, wherein each pixel location is a target of at least two different light emitting devices of a given color during the frame.

15. A projection system component comprising:

a frame buffer block which stores pixel data specifying desired pixel values for pixel locations in an image; and

a reordering block which reads selected pixel data from the frame buffer block and assigns the selected pixel data to corresponding light emitting devices in an array of light emitting devices, the pixel data being selected according to a mapping that maps the array of light emitting devices to target pixel locations toward which the light emitting devices will be directed, such that each pixel location is a target of at least two light emitting devices in each frame and each light emitting device is directed toward at least two pixel locations in each frame.

16. The projection system component of claim 15, further comprising a redundancy separation block which receives from the reordering block pixel data

and corresponding light emitting device assignments specifying the total expected emitted light for each assigned light emitting device during a frame, and the redundancy separation block allocates those light emitting device totals among the subframes of the frame.

17. The projection system component of claim 16, wherein the allocation of a light emitting device total is partly determined by pulse width modulation of the light emitting device.

18. The projection system component of claim 16, wherein the allocation of a light emitting device total is partly determined by intensity of the light emitting device.

19. The projection system component of claim 16, wherein the allocation of light emitting device totals specifies for each light emitting device that the energy emitted from that light emitting device will be approximately equal during each subframe.

20. The projection system component of claim 16, wherein the redundancy separation block comprises lookup tables.

21. The projection system component of claim 15, wherein the frame buffer block stores at least two frames of pixel data.

22. A projection system comprising:

a frame buffer block which stores pixel data specifying desired pixel values for pixel locations in an image;

a reordering block which reads selected pixel data from the frame buffer block and assigns the selected pixel data to corresponding light emitting devices in an array of light emitting devices, the pixel data being selected according to a mapping that maps the array of light emitting devices to target pixel locations toward which the light emitting devices will be directed, such that the sub-pixel vicinity of each pixel location is a light emitting device target at least twice per frame and each light emitting device is directed toward at least two pixel locations per frame;

a redundancy separation block which receives from the reordering block pixel data and corresponding light emitting device assignments specifying the total expected emitted light for each assigned light emitting device during a frame, and the redundancy separation block allocates those totals among the subframes of the frame;

an array of light emitting devices directed according to the signals provided by the frame buffer block, the reordering block, and the redundancy separation block; and

optics for guiding light from the light emitting devices toward the pixel locations.

23. The projection system of claim 22, wherein the array of light emitting devices comprises red light emitting devices, green light emitting devices, and blue light emitting devices.

24. The projection system of claim 23, wherein the red, green, and blue light emitting devices define an RGB light emitting device color space, and the system further comprises a colormapper block which converts input color space data into the RGB light emitting device color space from another color space.

25. The projection system of claim 24, wherein the colormapper block converts NTSC RGB data into the RGB light emitting device color space.

26. The projection system of claim 22, wherein the array of light emitting devices comprises at least one of the following types of light emitting devices: light emitting diodes, semiconductor lasers, vertical cavity surface emitting lasers.

27. The projection system of claim 22, wherein the optics comprise a rotating polygonal mirror.

28. The projection system of claim 27, wherein the optics comprise a rotating polygonal mirror for vertical control of light emitted from light emitting devices and another rotating polygonal mirror for horizontal control of light emitted from light emitting devices.

29. The projection system of claim 27, wherein the light emitting devices are turned off during blanking periods that correspond to vertices of the rotating polygonal mirror, thereby allowing for galvanometer mirror movement and settling.

30. The projection system of claim 27, further comprising a display having pixel locations toward which the light emitting devices are directed.

31. A projection system comprising:

a frame buffer means for storing pixel data specifying desired pixel values for pixel locations in an image;

a reordering means for reading selected pixel data from the frame buffer means and assigning the selected pixel data to corresponding light emitting devices in an array of light emitting devices, the pixel data being selected according to a mapping that maps the array of light emitting devices to target pixel locations toward which the light emitting devices will be directed, such that each pixel location is a target of at least two light emitting devices in each frame and each light emitting device is directed toward at least two pixel locations in each frame; and

a redundancy separation means for receiving from the reordering means pixel data and corresponding light emitting device assignments specifying the total expected emitted light for each assigned light emitting device during a frame, and the redundancy separation means allocates those light emitting device totals among the subframes of the frame.

32. The projection system of claim 31, wherein the allocation of a light emitting device total is partly determined by pulse width modulation of the light emitting device.

33. The projection system of claim 31, wherein the allocation of a light emitting device total is partly determined by intensity of the light emitting device.

34. The projection system of claim 31, wherein the allocation of light emitting device totals specifies for each light emitting device that the energy

emitted from that light emitting device will be approximately equal during each subframe.